Exercise in the management of cravings, withdrawal symptoms and smoking behaviour

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OVERVIEW

- Review of chronic exercise interventions
- Review & examples of acute exercise interventions
- Possible mechanisms
- Practical & research implications

Innovation?

- Morgan, P., Gildiner, H.L., & Wright, G. (1976). Smoking reduction in adults who take up exercise. *CAHPER Journal*. 42, 39-43.
- Only three of thirty-five runners who were smoking cigarettes when they first started to run still smoked.
- 91% abstinence rate!

Multiple Health Behavior Change

- Majority of health promotion interventions address risk factors as categorically separate entities yet health behaviors often cluster
- ‘Teachable’ moments
- Synergy

Exercise & Smoking Cessation

- Harm reduction?? [see deRuiter & Faulkner, 2006; *Nicotine Tob Res.* 8(2):157-68].
- Exercise may have a moderating effect on many of the variables negatively affected by nicotine withdrawal
  - Mood disturbance
  - Depression
  - Subjective stress
  - Sleep disturbance
  - Weight management

Fox, Faulkner, Biddle, & Mutrie (2004)

Do exercise interventions improve quit rates?

Systematic reviews on *Chronic effects on abstinence*:

- **Ussher (2005) Cochrane Review**

- **Faulkner, G., Taylor, A., Urban, S., Ferrence, R., & Selby, P. (2006). Exercise and smoking cessation: A better practices knowledge synthesis. Exercise Psychology Unit, University of Toronto, Toronto, Ontario.**

Electronic copies available on request.

Abstinence rates at longest follow-up

Study	Exercise	Control	
1. Alexander 89	13/21 57.7%	12/21 56.3%	
2. Howley 81	0/9; 0%	0/9; 0%	
3. Hill 95	7/18 41%	5/18 30%	
4. Hill 93	5/18 27.8%	7/22 31.8%	
5. Marcus 91	2/10 20%	0/10 0%	
6. Marcus 95	3/10 30%	1/10 10%	
*7. Marcus 99	16/134 11.9%	8/147 5.4%	p=0.05
8. Marcus 03	1/109 0.9%	1/109 0.9%	
9. Martin 97	19/72 26.4%	18/70 25.7%	
10. Prapavessis 04	12/68 17.7%	8/53 15.1%	
11. Mustonen 05	9/92 9.8%	7/56 12.5%	
12. Russell 88	Not given	Not given	
13. Taylor 88	29/42 69.0%	16/26 61.5%	
14. Ussher 03	19/154 12.4%	19/145 13.1%	
15. Vickers	6/30 20%	6/30 20%	

Conclusions from chronic studies

- 1/15 trials showed exercise aids smoking cessation in long-term
- 4/15 trials showed positive effects at end of treatment.
- Non-significant trials had methodological limitations (e.g., underpowered or insufficiently intense intervention).
  - There is no evidence that promoting exercise detracts from smoking cessation efforts.
  - When measured objectively, interventions can increase short-term exercise participation among smokers, pre-quitters and quitters, and adherence is comparable to typical exercise interventions.
- Focus has been on weight management (rather than coping with cravings & withdrawal symptoms)

Review using “Better practices framework”

Faulkner, G., Taylor, A., Urban, S., Ferrence, R., & Selby, P. (2006). *Eur. J. of Sports Science.*

- Research experts believe exercise has potential
- Practitioner experts promote exercise as a valuable strategy

Do single sessions of exercise reduce cravings & withdrawal symptoms?

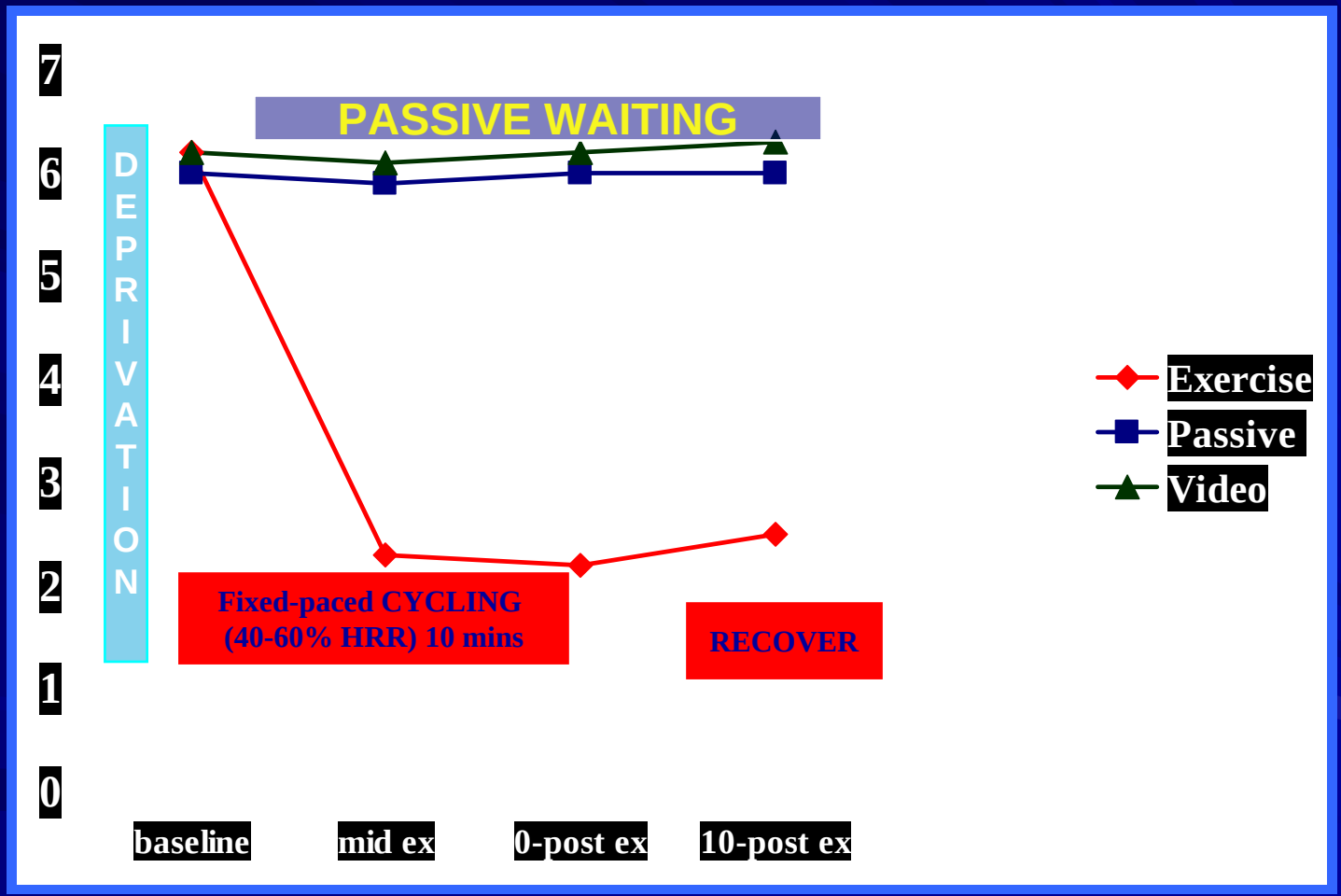
Systematic Review

14 studies identified
All except 1 involved temporary abstinence (30 mins – 15 hrs)

- 12 acute studies compared a bout of exercise with a control condition
- All reported positive effect on cigarette cravings, withdrawal symptoms and/or smoking behaviour
- Insufficient evidence to support a linear or curvilinear relationship between intensity/duration & effect on cravings

Taylor, Ussher & Faulkner (under review)

Effects on desire to smoke

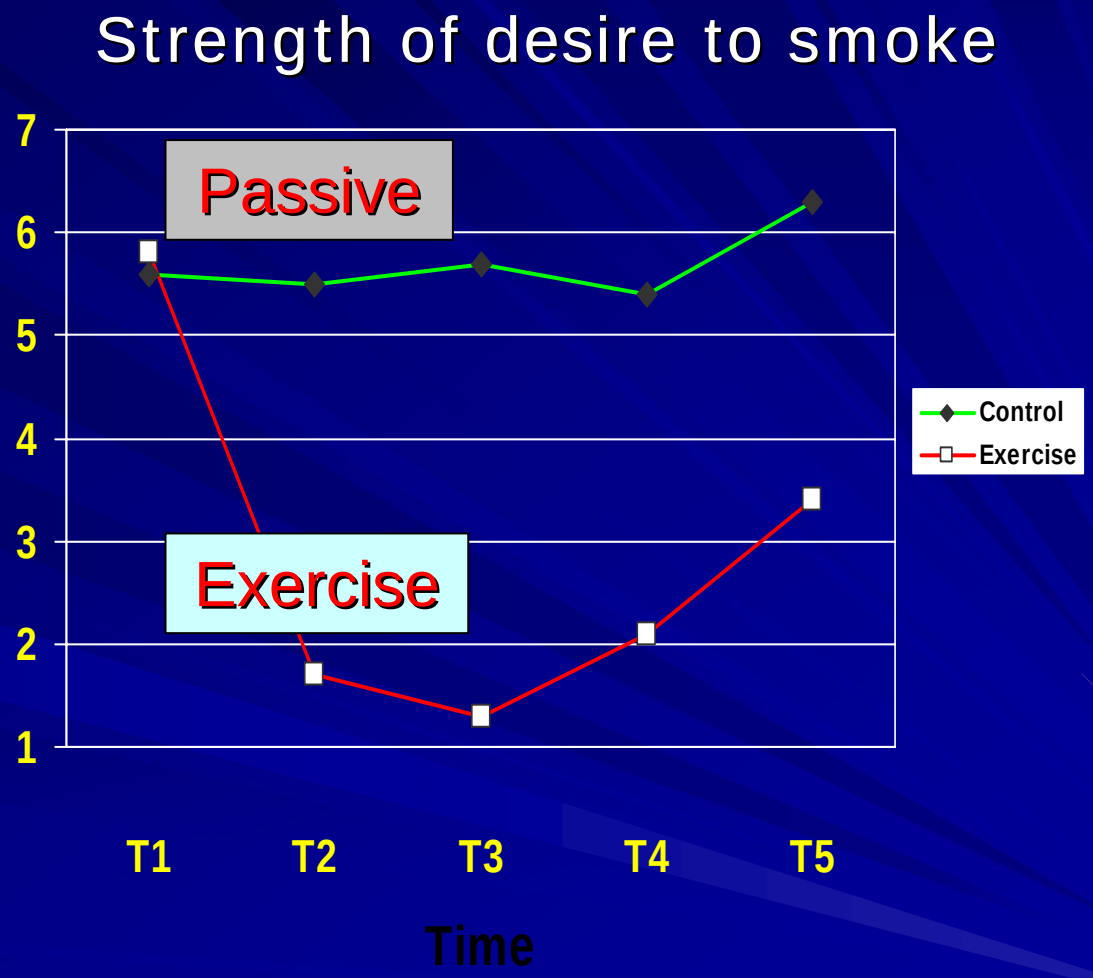


Ussher et al., Psychopharmacol, 2001, 158, 66-72

Effect of self-paced walking on strength of desire to smoke

N = 15 smokers
(15hrs abstinent)

Self-paced 1 mile
walk v rest



Similar effects on MPSS items: tension, stress, anxiety, restlessness, poor concentration, irritability, depression

T1 = baseline, T2 = 10 mins, T3 = 20 mins, T4 = 30 mins, T5 = 40 mins.

Taylor, Katomeri & Ussher (2005). Psychopharmacology 174: 320-6.

Scerbo & Faulkner (2006; *SCAPPS*)

N = 13 smokers (12hrs abstinent)

15 minutes brisk walk v rest

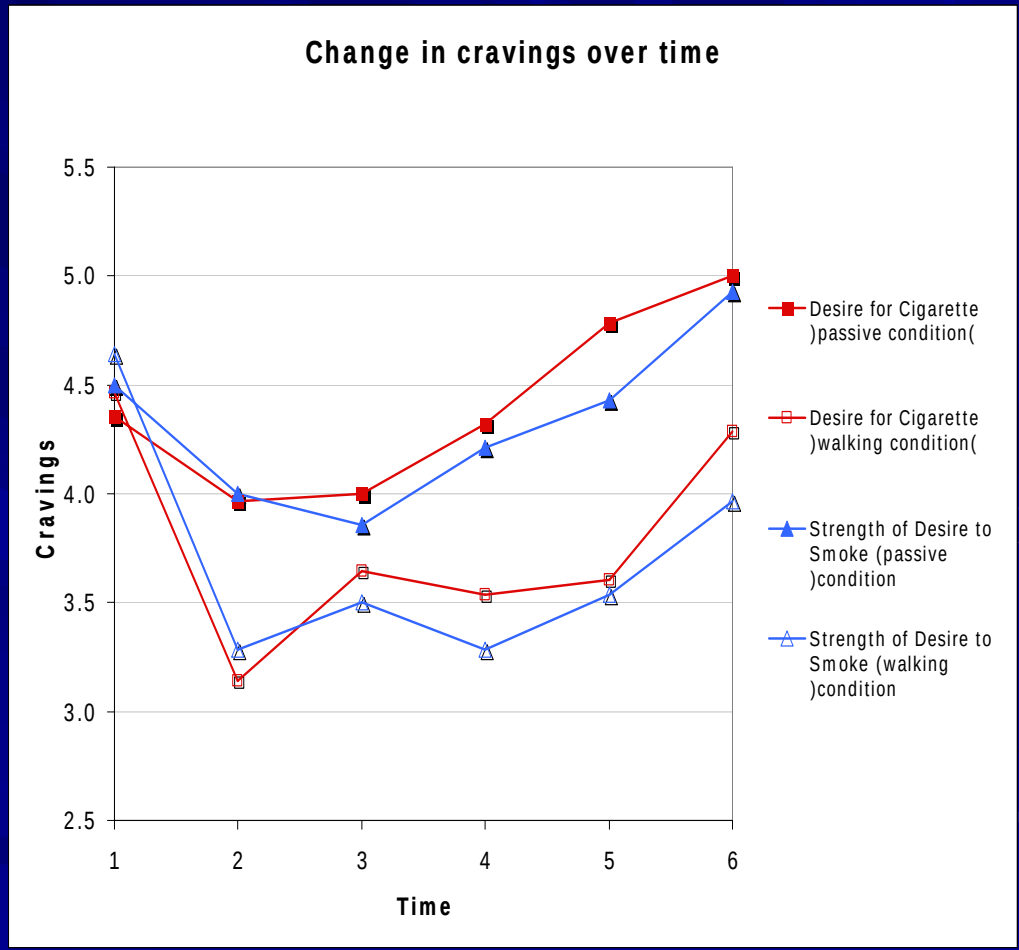
Subjects sent text for ad lib smoking

Ad libitum smoking

Exercisers = 152 mins
Control = 99 mins

(ie, net 53 mins later)

Strength of desire to smoke



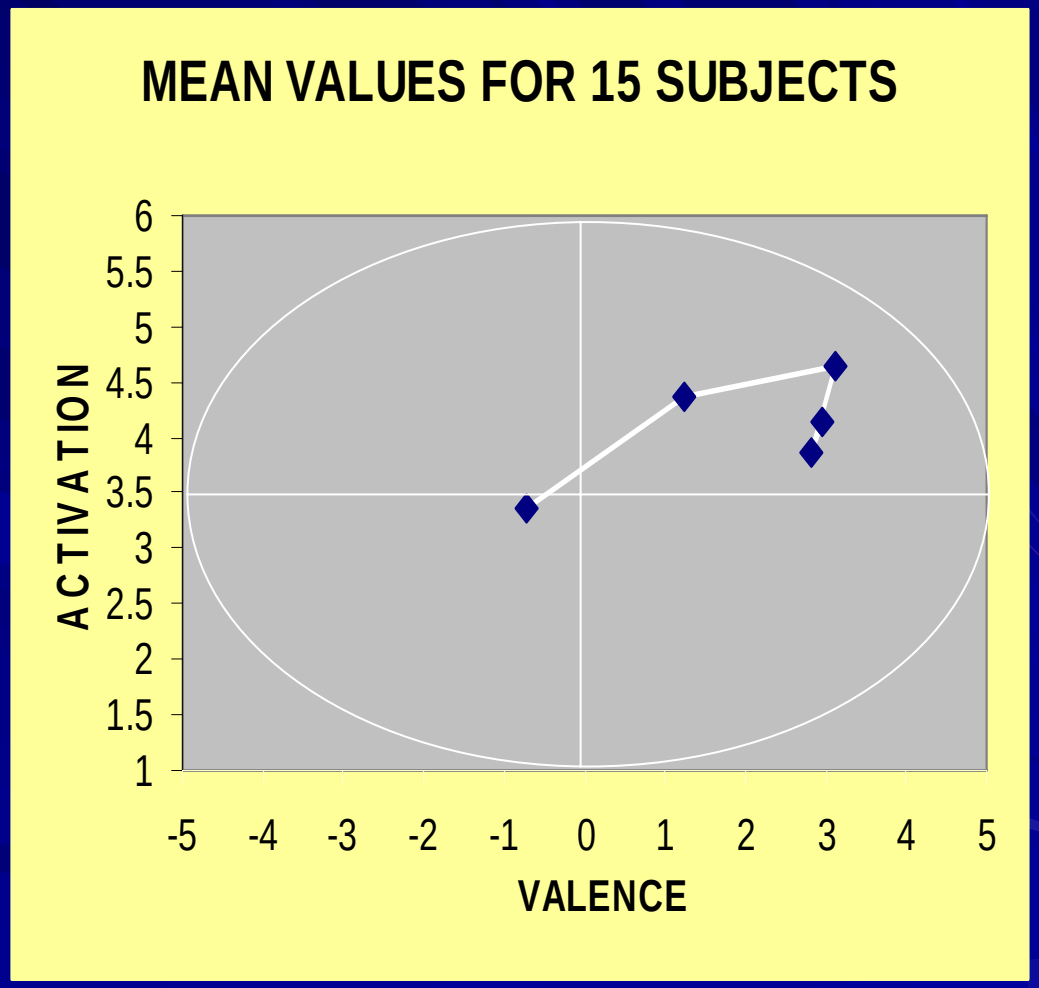
Acute Effects: Conclusions

- **Clear evidence that a low-moderate dose of exercise**
  - **Reduces the desire for a cigarette;**
  - **Reduces 'negative' withdrawal symptoms (eg, stress, irritability, depression);**
  - **And improves affect.**
- **Magnitude of reduction in cravings comparable with, or in many cases exceeding, the acute response to glucose & oral NRT (see West et al 1999; West & Shiffman 2001)**
- **Further work is needed to examine the mechanisms associated with the acute effects of exercise in natural settings among different groups and conditions of abstinence.**

Possible mechanisms

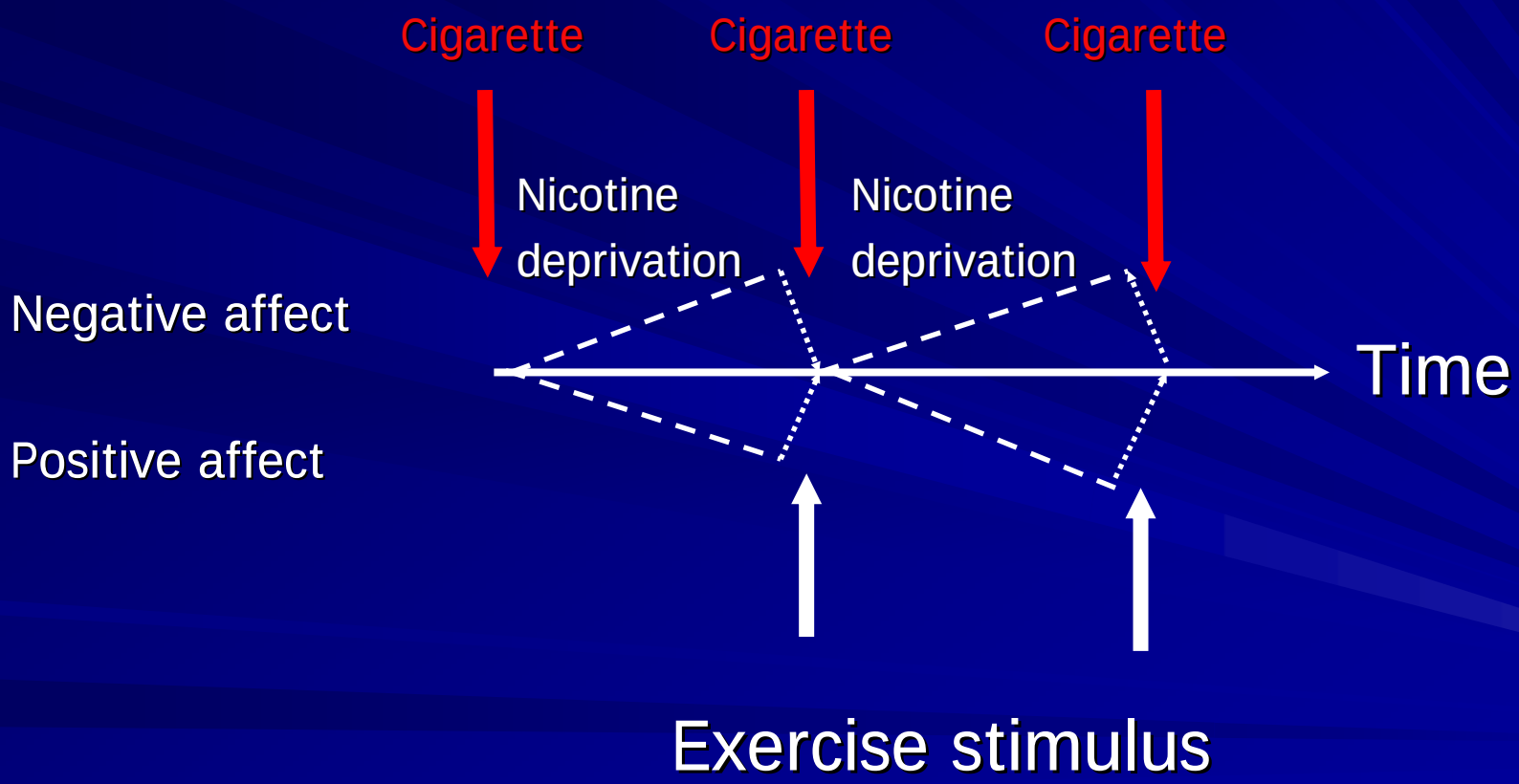
- Distraction appears unlikely (Daniel et al, 2006)
- Stress reduction and activation
  - Nesbitt's Paradox – reduces tension & increases stimulation

Circumplex model of affect
(Russell, 1978, 1980, 1989, 1997)
(Ekkekakis et al, 2000, 2003, Psych of Sport & Ex.)



Taylor, Katomeri & Ussher (2006). J of Sport & Ex. Psych, 28, 18-31.

Deprivation reversal hypothesis (Schachter, 1978)



Exercise mimics relief of negative affect

Possible mechanisms

Psycho-biological

- Increases in Dopamine activity?
  - Other substance use moderated by exercise with animals (eg, amphetamine, Kanarek, 1995; cocaine, Cosgrove, 2002; ethanol, McMillan, 1995).
- Increases in cortisol?
- Other?

  - fMRI studies on effects of exercise on cravings - anyone?

Practical & research implications

- Advise regular brief low-mod intensity exercise, and possibly to attenuate acute cravings in response to smoking cues (with timing implications).
- Brief & intermittent
- 30 minutes moderate physical activity accumulated each day
  - May assist with weight management.
- This line of research may be useful for designing exercise interventions for emotion regulation with and without the presence of psychological stress.

- People who exercise still smoke before, during and after activity!
  - ~ 25% smokers ‘active’ (deRuiter, Faulkner, & Cairney, in prep)